

REMARKS

I. Introduction

Claims 1-27 and 31 are currently pending in the present application. In view of the foregoing amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

II. Rejection of Claims 1, 2, 5, 7-9, 11, 17-19, And 23-27 Under 35 U.S.C. § 103(a)

Claims 1, 2, 5, 7-9, 11, 17-19 and 23-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,339,842 ("Bok"). Applicants respectfully submit that these claims are not unpatentable for at least the following reasons.

Claim 1 relates to a fluid meniscus process. Claim 1 recites that the process includes the step of holding at least a portion of a first surface of an object with a holding fixture, such that at least a portion of a second surface of the object is exposed. Claim 1 recites that the process includes the step of injecting at least one fluid in a tank such that a fluid meniscus is formed. Claim 1 also recites that the process includes the step of contacting at least a portion of the second surface of the object with at least a portion of the fluid meniscus. Claim 1 recites that the process includes the step of moving the object and the tank in two or more consecutive lateral directions relative to each other, the meniscus being in contact with the object during each one of the two or more consecutive lateral direction movements. Claim 1 has been amended herein without prejudice to recite that the meniscus generates consecutive uniform stripes. Support for this amendment can be found, for example, at page 9, lines 19-21 of the Specification which states that "the substrate 14, moves over the meniscus 16, in such a manner as to expose successive narrow substrate area elements, or stripes, to the liquid 23." Claim 1 further recites that the process includes the step of removing the object after at least one contact with the fluid meniscus.

Bok relates to an apparatus for cleaning an object. Bok describes that the apparatus includes a first reservoir having a top end which is at least partially open, a bottom end which is at least partially closed, at least one side wall and a weir disposed at the top end. Bok states that the apparatus also includes a second reservoir having a top end which is at least partially open, a bottom end which is at least partially closed and at least one side wall, said

second reservoir being positioned such that the top end of the second reservoir is below the top end of the first reservoir and aligned to receive a liquid cleaning fluid flowing from the first reservoir over the weir. Also, Bok states that the apparatus includes a transducer disposed at the bottom end of the first reservoir, which generates megasonic vibrations in a generally perpendicular direction from the bottom end toward the top end of the first reservoir. Bok at col. 2, line 67 – col. 3, line 16.

Respectfully, Bok does not render claim 1 unpatentable for at least the reason that Bok does not disclose, or even suggest, all of the limitations of claim 1. For instance, Bok does not disclose, or even suggest, a meniscus process in which the meniscus generates consecutive uniform stripes as recited in claim 1. The Specification states at page 9, lines 19-21 that “the substrate 14, moves over the meniscus 16, in such a manner as to expose successive narrow substrate area elements, or stripes, to the liquid 23.” The Specification also states at page 9, line 24 – page 10, line 2 that “[b]y effecting the processing in such narrow stripes, most if not all asymmetries related to mass and thermal transport to the edges are virtually eliminated.” The Specification also states at page 6, lines 20-21 that “[t]he high etch rates and uniformity of which the subject of this invention is capable makes it an attractive choice for the fabrication of thin substrates.” Emphasis added.

In contrast, Bok describes a megasonic bucket, e.g., an arrangement for megasonic cleaning of an object. Bok states at col. 1, lines 45-49, that “[u]ltrasonic and megasonic cleaning methods usually involve immersing the objects in a bath of liquid cleaning fluid and introducing the ultrasonic or megasonic vibrations through the cleaning fluid to dislodge particles attached to the surface of the objects.” In describing the problems associated with the conventional ultrasonic and megasonic cleaning methods, Bok states at col. 1, lines 49-54, that “[s]uch cleaning methods usually operate in a batch mode, thereby requiring subsequent handling of the objects, either by robots or humans, after cleaning and prior to the next process step, e.g., coating ... accordingly, small particles can readily attach to the surfaces during such handling.” Bok purports to solve this problem by providing, in essence, an inverted immersion bath, such that fluid that is above a weir of a reservoir contacts an object for cleaning the object prior to subsequent processing. While Bok also states that “[t]he overall size of the apparatus is not critical to the present invention”, Bok goes on to state that “[a] typical apparatus ... will have

a length of about 1 to 6 inches [and the] width will typically be dependent upon the width of object being coated which often ranges, for example, from about 6 to 24 inches.” It is evident that Bok does not, and was not intended to, disclose or suggest a meniscus process in which the meniscus generates consecutive uniform stripes, nor hints at the capability of uniform material removal. There is no disclosure or suggestion in Bok that consecutive uniform, e.g., narrow, contact is obtained or even desired. On the contrary, in stating that “the width [of the meniscus of the apparatus] will typically be dependent upon the width of object”, it is evident that Bok intends to clean the entire width of an object, e.g., in a manner that is as close as possible to the immersion baths that it purports to improve upon.

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a prima facie case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). As indicated above, nowhere does Bok disclose, or even suggest, a meniscus process in which the meniscus generates consecutive uniform stripes, as recited in claim 1.

Since Bok does not disclose, or even suggest, all of the limitations of claim 1 as more fully set forth above, it is respectfully submitted that Bok does not render obvious claim 1. Furthermore, it is respectfully submitted that Bok does not render obvious claims 2, 5, 7-9, 11, 17-19 and 23-27, which depend from claim 1 and therefore include all of the limitations of claim 1. In re Fine, supra (any dependent claim that depends from a non-obvious independent claim is non-obvious). Therefore, withdrawal of this rejection, and the allowance of claims 1, 2, 5, 7-9, 11, 17-19 and 23-27, is respectfully requested.

III. Rejection of Claim 3 Under 35 U.S.C. § 103(a)

Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Bok in view of U.S. Patent No. 5,171,393 (“Moffat”). Applicants respectfully submit that claim 3 is not unpatentable for at least the following reasons.

Respectfully, the combination of Bok and Moffat does not disclose, or even suggest, all of the limitations of claim 1, from which claim 3 depends. As set forth more fully above, Bok does not disclose, or even suggest, all of the limitations of claim 1. Furthermore, Moffat is not relied upon to describe or suggest, and in fact does not describe or suggest, the features not described or suggested by Bok. Specifically, the Office Action states that “Bok does not expressly teach a holding means that it ‘fluidic’ [but] Bok discloses a ‘rotating chuck’ for holding the object. (Col. 6, Lines 27-28) [and] typically rotating chucks use fluidic means such as vacuum to secure a substrate for processing.” Office Action at page 4. The Office Action maintains that “Moffat teaches a rotating vacuum chuck (Col. 3, Lines 9-21) for wet processing a substrate.” The Office Action concludes that “[i]t would have been obvious to one of ordinary skill in the art at the time of invention to use a fluidic means such as a vacuum chuck in order to secure the substrate for wet processing as show by Moffat.” Office Action at page 4. Moffat does not disclose, or even suggest, a meniscus process in which the meniscus generates consecutive uniform stripes, as recited in claim 1.

Since the combination of Bok and Moffat does not disclose, or even suggest, all of the limitations of claim 1 as more fully set forth above, it is respectfully submitted that the combination of Bok and Moffat does not render obvious claim 3, which depend from claim 1 and therefore include all of the limitations of claim 1. It is respectfully submitted that claim 3 is allowable for at least the same reasons that claim 1 is allowable. In re Fine, supra (any dependent claim that depends from a non-obvious independent claim is non-obvious). Therefore, withdrawal of this rejection, and the allowance of claim 3, is respectfully requested.

IV. Rejection of Claims 4, 6, 10 and 12-16 Under 35 U.S.C. § 103(a)

Claims 4, 6, 10 and 12-16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bok in view of U.S. Patent No. 5,660,642 (“Britten”). Applicants respectfully submit that claims 4, 6, 10 and 12-16 are not unpatentable for at least the following reasons.

Respectfully, the combination of Bok and Britten does not disclose, or even suggest, all of the limitations of claim 1, from which claims 4, 6, 10 and 12-16 depend. As set forth more fully above, Bok does not disclose, or even suggest, all of the limitations of claim 1. Furthermore, Britten is not relied upon to describe or suggest, and in fact does not describe or suggest, the features not described or suggested by Bok. Specifically, the Office Action admits that “Bok does not expressly teach that the fluid is an etching fluid or that an etching process is performed [, rather] Bok teaches more broadly “cleaning” and removal of particles from surface.” Office Action at page 4. The Office Action maintains that “Britten teaches that meniscus processes are used for cleaning, developing and etching processes[, s]ee Abstract and (Col. 2, Lines 40-45) of Britten.” Office Action at page 4. The Office Action concludes that “[i]t would have been obvious to one of ordinary skill in the art at the time of invention to use either cleaning developing or etching fluid in order to process the substrate as taught by Britten.” Office Action at page 4. Britten does not disclose, or even suggest, a meniscus process in which the meniscus generates consecutive uniform stripes, as recited in claim 1. On the contrary, Britten states in the Field of the Invention, at col. 1, lines 13-14, that it “relates to the aqueous processing of the surfaces of large ... objects” and does not hint at the capability of uniform material removal.

Since the combination of Bok and Britten does not disclose, or even suggest, all of the limitations of claim 1 as more fully set forth above, it is respectfully submitted that the combination of Bok and Britten does not render obvious claims 4, 6, 10 and 12-16, which depend from claim 1 and therefore include all of the limitations of claim 1. It is respectfully submitted that claims 4, 6, 10 and 12-16 are allowable for at least the same reasons that claim 1 is allowable. In re Fine, supra (any dependent claim that depends from a non-obvious independent claim is non-obvious). Therefore, withdrawal of this rejection, and the allowance of claims 4, 6, 10 and 12-16, is respectfully requested.

V. Rejection of Claim 20-22 Under 35 U.S.C. § 103(a)

Claims 20-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bok in view of Britten and U.S. Patent No. 5,279,703 (“Haberger”). Applicants respectfully submit that claims 20 to 22 are not unpatentable for at least the following reasons.

Respectfully, the combination of Bok, Britten and Habberger does not disclose, or even suggest, all of the limitations of claim 1, from which claims 20-22 ultimately depend. As set forth more fully above, the combination of Bok and Britten does not disclose, or even suggest, all of the limitations of claim 1. Furthermore, Habberger is not relied upon to describe or suggest, and in fact does not describe or suggest, the features not described or suggested by the combination of Bok and Britten. Specifically, the Office Action admits that “Bok in view of Moffat and Britten ... does not teach the use of electromagnetic radiation.” Office Action at page 5. The Office Action maintains that “Habberger teaches a process for etching a substrate in which electromagnetic radiation is used to heat a substrate and improve the etch rate (Col. 4, Lines 65-69).” Office Action at page 5. The Office Action concludes that “[i]t would have been obvious to one of ordinary skill in the art of the time of invention to irradiate the substrate in the well-known manner in order to heat the substrate and improve the etch rate as indicated by Habberger (Col. 4, Lines 6-10) [and that] the location of the energy source is not afforded patentable weight because one of ordinary skill in the art would recognize that the energy source could be secured anywhere that permits the energy source to focus on the substrate as a matter of design choice.” Office Action at page 5. Habberger does not disclose, or even suggest, a meniscus process in which the meniscus generates consecutive uniform stripes, as recited in claim 1.

Since the combination of Bok, Britten and Habberger does not disclose, or even suggest, all of the limitations of claim 1 as more fully set forth above, it is respectfully submitted that the combination of Bok, Britten and Habberger does not render obvious claims 20-22, which depend from claim 1 and therefore include all of the limitations of claim 1. It is respectfully submitted that claims 20-22 are allowable for at least the same reasons that claim 1 is allowable. In re Fine, supra (any dependent claim that depends from a non-obvious independent claim is non-obvious). Therefore, withdrawal of this rejection, and the allowance of claims 20-22, is respectfully requested.

Applicants respectfully submit that all of the pending claims of the present application are now in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

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Respectfully submitted,

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